

22. Cellular users pay two charges in their bill: access and usage. Access is about \$35 per month while usage could be about 39 cents per minute. Thus, if average usage is say 200 minutes per month, average revenue per minute is \$0.565, while if average usage decreases to 160 minutes per month, but rates remain the same, average revenue per minute increases to \$.609 per minute. Thus, the DOJ calculation would find a price increase of 7.7% when, in actuality, no price increase had occurred. This decrease in average minutes per use has occurred in the cellular industry as heavy users adopted cellular first, but more recently a higher proportion of less frequent users have bought cellular service. Indeed, this trend toward less frequent usage is documented in Cellular Telephone Industry Association data which shows that the average monthly cellular bill decreased from \$83.94 in 1990 to \$61.48 in 1993. Thus, in doing their only actual analysis of any cellular billing data, the DOJ forget to hold usage constant. The DOJ has merely discovered that, with a fixed cost and constant marginal cost, average cost increases with less output, and vice versa. But that finding has nothing to do with whether prices are, in fact, rising or falling. Every elementary textbook in microeconomics demonstrates the error in the DOJ attempted comparison. Thus, the DOJ has not presented any actual, correct economic data which supports its claim that cellular providers have market power. The CPUC reliance on the DOJ memorandum is misplaced, because when the DOJ mistake is corrected, cellular prices actually decreased.

#### B. Similar Prices Do Not Demonstrate a Lack of Competition

23. The CPUC then makes another economic mistake, as elementary as the DOJ's. It makes a finding that similar prices in the same MSA, e.g. Los Angeles, demonstrates a lack of competition. (CPUC, pp. 34, 40-42) It is a well known fact of economic life that close substitutes typically sell at near identical prices: Kodak and Fuji film (1% price difference throughout the U.S.), Coke and Pepsi (less than 2% price difference), Mobil and Exxon gasoline, mortgage rates from the Bank of Boston and Fleet Bank, and so on.

The A Block and B Block cellular carriers are offering an identical technology with identical CPE and their products must be similarly priced or consumers will buy the lower priced brand. Thus, what the CPUC has demonstrated is that Block A cellular service and Block B cellular service are extremely good substitutes for each other. The finding would not surprise users of cellular service who often switch from one provider to another when special promotions are offered.

C. ESMR Q-Ratios are Similar to Cellular Q-Ratios

24. To claim that the cellular carriers have market power the CPUC refers to a study by Professor Hazlett that claims that cellular carriers have high "Q-ratios" which he claims proves market power. (CPUC, pp. 62-64) Hazlett's has a number of defects which have been previously noted. However, since the Q-ratio is defined as a firm's market price divided by the replacement cost of its assets, Hazlett's omission of the asset value of current customers gives a large upward bias to his calculations. Customer acquisition costs between \$350-500 each in terms of rebates to agents and other variable costs such as marketing. The average customer stays on the system for about 3 years. Thus, customers are an expensive asset which must be replaced. Hazlett's calculations ignore the investment in customers which of course are the primary source of revenue for a cellular carrier.

25. However, even using Hazlett's calculations as they stand, they do not demonstrate market power. I have calculated the Q-ratios for the 3 primary ESMR companies, Nextel, OneComm, and Dial Call, based on their market price (they are all traded on the NASDAQ) and their companies reports. Their average Q-ratio is 8.6. Thus, the ESMRs have Q-ratios very similar (although slightly lower) than the cellular carriers. How can the ESMRs have such high Q-ratios if they are just beginning operation? The answer is that investors reward high expected growth with high market prices. The cellular industry has grown at 35-40% per year. ESMR and PCS are expected to grow at similar

rates. These high growth rates are the primary reason for high market valuations and why I expect much higher winning bids for the PCS spectrum than the CBO has predicted. So long as the extraordinary high growth continues and spectrum is limited for use in mobile telecommunications, I expect that the high valuation of mobile telecommunications providers and equipment providers (Qualcomm Q-ratio = 6.9) will continue.<sup>18</sup>

D. Regulatory Rates of Return are Not Accurate Indicators of Market Power in the Cellular Industry

26. Lastly, in an attempt to demonstrate market power the CPUC petition considers accounting rates of return for the cellular carriers in California. (CPUC, pp. 46-49) Economists have realized for a very long time that accounting rates of return are often a very poor guide to economic rates of return because of difficulties in estimating the economic depreciation and economic value of a companies assets. Accounting depreciation rates are often far different from economic depreciation rates, especially when an industry is growing fast and technology is changing rapidly. Both factors are present in the cellular industry. For instance, consider an investment in fiber optic transmission capacity for which a 10 year life is used to calculate accounting profits. If straight line depreciation is used, at the end of 3 years only 30% of the investment would have been depreciated. However, if the price of new fiber optic transmission capacity had decreased by say 25% during the same time period because of price decreases in electronics, this price decrease would need to be used in calculating the correct measure of economic

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<sup>18</sup> The CPUC claims that it expects the per-MHz value of licensed spectrum to be "roughly equivalent" on a national bases. (CPUC, pp. 55-56) The comparison with the per-MHz value of TV spectrum is quite senseless since the two uses of spectrum cannot be interchanged. Also, on a national basis I would expect values to differ significantly. The CPUC appears to believe that the land value of a city block on Union Square in San Francisco or upper Madison Avenue in New York should be the same as the value of a city block in my home town of Weirton, W.Va. (population 22,000) The economic reality is quite different because of the scarcity value of the land.

depreciation.<sup>19</sup> Failure to take account of decreasing network equipment prices and the use of excessively long depreciation lives leads to a calculated rate of return which exceeds the true economic rate of return.

27. A second significant problem in using regulatory rates of return in the cellular industry is the high cost of customer acquisition. Cellular companies offer commissions and bonuses to their sales agents for new customers. These rebates vary widely, but they are often in the range of \$100-425 per customer. The rebates are passed on to new cellular customers in the form of large discounts on the price of cellular telephones which are often sold for prices around \$50 to new customers. These new customers are an asset to a cellular company since the average customer continues service for around 3 years and their replacement cost should be included in the cellular companies value which appears in the denominator of a rate of return calculation. Exclusion of the replacement cost of new customers means that a calculated accounting rate of return will overstate the true economic rate of return.

28. Regulatory commissions have used regulatory rates of return for many years. To the extent that regulatory rates of return for cellular companies are not significantly above regulatory rates of return for LECs, after adjusting for differences in risk, the conclusion of "just and reasonable" prices can be inferred from the data. However, the risk of cellular telephone is considerably greater than the risk for telephone companies, either LECs or IXC's.

29. The most widely used measure of risk in financial economics is the value of "beta". Beta is derived from the Capital Asset Pricing Model (CAPM)

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<sup>19</sup> If this rate of price decrease were to continue for the full 10 years, the new price of the equipment would have decreased by 61.7% over the period.

and referred to as "the standard risk measure for individual securities."<sup>20</sup> (Prof. W.F. Sharpe was awarded the Nobel Prize in Economics for his development of beta and of the CAPM.) The beta of a company measures how sensitive it is to underlying market movements where a beta equal to 1.0 is the average risk for a company. Value Line, an investment advisory service, estimates beta. For LECs and IXC's the estimated betas are less than 1.0. For instance, Value Line estimates the betas for SNET, Southwestern Bell, and AT&T all to be equal to 0.95. Using more refined statistical techniques, I estimate the beta of SNET to be 0.69, Southwestern Bell to be 0.70, and AT&T to be 0.88 which seems closer to the actual situation where significant parts of AT&T, e.g. Network Systems which sells equipment, are riskier than LECs. Very few stand alone cellular companies exist so reported betas are scarce. However, Value Line reports the beta for the largest cellular company, McCaw to be 1.85. I estimate McCaw's beta to be 2.11.<sup>21</sup> Thus, using either Value Line's estimate, or my estimate, McCaw and Metro Mobile before its merger with BAM is at least twice as risky as LECs and IXC's.

30. The beta estimates can then be used to estimate the cost of equity capital. I use the average market risk premium of 8.4% which is then multiplied by beta and added to the risk free (treasury bill) rate to estimate the equity cost of capital.<sup>22</sup> For AT&T the estimated equity cost of capital is 10.42. For McCaw the estimated equity cost of capital is 20.7%. Thus, the equity cost of capital for McCaw is about two times higher than for AT&T or for the LECs.

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<sup>20</sup> R. A. Brealey and S.C. Myers, Principles of Corporate Finance, (McGraw Hill, 4th Edition, 1991), p. 129.

<sup>21</sup> I estimated the beta of Metro Mobile which operated the Block A cellular system in Connecticut, before its merger with BAM, to be 1.8.

<sup>22</sup> See e.g. Brealey and Myers, op. cit., p. 131, for an explanation of this calculation.

31. Even using CPUC calculated rates of return, the results are mixed. In medium sized markets, e.g. Santa Barbara, and the RSAs, the calculated returns are below a competitive risk adjusted level in 1993.<sup>23</sup> Thus, the 3 "major markets" of San Diego, San Francisco, and Los Angeles remain. In San Diego the average calculated rate of return is 16.6% which is in the competitive range. In San Francisco the Block B (GTE) carrier's rate of return is 18.1%, again in the competitive range.<sup>24</sup> The Block A carrier does have a significantly higher calculated rate of return, but since competition sets prices at the margin, the greater efficiency of the Block A carrier compared to the Block B carrier has led to its higher returns. Lastly, Los Angeles does have high calculated rates of return, both above 30%. However, the CPUC's calculations demonstrate that the return to the Block A carrier, LACTC, has decreased by 52% over the past 5 years and the return to the Block B carrier (AirTouch) has decreased by 46%. Both prices and returns will likely decrease even more in Los Angeles if the CPUC was pre-empted from rate regulation. Los Angeles is the first market which Nextel has entered, and to the extent that Los Angeles is seen as a problem, competition from Nextel which has already begun operation should lead to lower prices and lower calculated rates of return.

IV. CMRS Competition Is Increasing Especially in California, but the CPUC has Decided to Ignore It

A. The CPUC Has Not Taken Sufficient Account of New Entry

32. Nextel is beginning full operation of its ESMR network this year. Thus, increased competition in CMRS, especially in California, will be created by this new entrant. Nextel began operation in Los Angeles in 1993, recently

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<sup>23</sup> For instance the average calculated return in the medium size markets is 13.0%.

<sup>24</sup> Note that GTE is among the top 4 cellular providers in the U.S. so that size cannot explain this result.

began operation in San Francisco this year and plans to begin operation in New York in 1994: "Nextel expects to activate the Digital Mobile networks in San Diego,..., the New York tri-state area, Chicago and Milwaukee sometime later in calendar year 1994...." (Nextel Prospectus, Feb. 11, 1994, p. 4) By the end of this year Nextel expects to be in operation covering the large majority of the California population, about 90% according to its Prospectus.<sup>25</sup> Indeed, Nextel recently announced it had begun operation of its San Francisco and Sacramento based networks. Nextel has now expanded its plans, and has purchased sufficient ESMR spectrum from Motorola and other companies to be able to offer its services to about 70% of the population in the U.S.<sup>26</sup> Nextel's proposed service areas cover about 180 million people and 47 of the top 50 U.S. SMSAs.

33. Nextel has not encountered any difficulty in raising capital to finance these expansion plans.<sup>27</sup> Indeed, the market capitalization of Nextel currently exceeds \$3.0 billion. Nextel recently announced plans to acquire the other two major ESMR providers, Dial Call and OneComm. Dial Call (formerly Dial Page) is constructing an ESMR network throughout the Southeastern U.S. Similarly, Onecomm (formerly Cencall) plans to offer ESMR service throughout the Rocky Mountain Region and the Pacific Northwest. These 3 ESMR companies cover almost the entire U.S, so that Nextel will be able to offer service to over 85% of the U.S. in almost every major MSA, with over 200 million pops in its service area when the acquisitions are completed. Nextel is likely to have a competitive advantage over cellular because of the larger geographical areas covered and the seamless roaming arrangements. No cellular

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<sup>25</sup> Nextel has recently stated, "Using the same digital technology already in place in Los Angeles, Nextel will have its new wireless system up and running throughout California by the end of this year. (Nextel Communications, 1994 Annual Report, August 1994, p. 6)

<sup>26</sup> McCaw, the largest cellular carrier, has service areas which cover about 25% of the U.S. population.

<sup>27</sup> Nextel recently raised approximately \$700 million in a public debt offering in February 1994.

carrier has more than about a 24% share of pops with McCaw having about 63 million pops. Thus, McCaw's coverage is only about 1/3 as large as Nextel. This considerably greater geographical coverage will provide a significant competitive advantage to Nextel's network.

34. The recent FCC decision to allocate 120 MHz of spectrum for the construction of Personal Communications Service (PCS) networks will also lead to significant new entry by CMRS providers. Interest is very high among potential PCS providers which includes local telephone companies (both in and outside their regions), local cable TV companies, cellular companies, and many other companies. The recently completed narrowband PCS auction demonstrates the high degree of interest in the provision of new services. PCS broadband auctions are likely to begin by the end of 1994. PCS will begin to provide significant new competition to cellular beginning in 1995 or 1996. A minimum of 3 new 30 MHz band PCS providers will offer service in each geographical area, plus one or more other new providers in the 10 MHz bands.

35. PCS already works. In December 1993 when I visited the United Kingdom (UK), I used the PCS network which has been constructed by Mercury in partnership with U.S. West. The second PCS network in the UK, the Orange network operated by Hutchison Telecom, began operation in April 1994. The Orange network already covers 50% of the UK population, and it plans to cover 70% by the end of 1994, and 90% by the end of 1995. Both the Mercury and Orange networks have been successful almost from their inception--about 25% of new mobile activations in the UK in the latest quarter have been on these new networks.

36. PCS operates in the 1800 MHz band in the U.K. which is approximately the same frequency band that much of PCS is scheduled to utilize

in the U.S.<sup>28</sup> The handsets offered, manufactured by Nokia and Motorola, are virtually identical to the smallest cellular handsets available in the U.S. Thus, PCS is convenient to use and offers a wider range of services than are offered by the 2 UK cellular operators. Since PCS began operation in the UK during 1993, cellular prices in the UK have decreased by about 20-33%. Thus, PCS will provide increased competition to cellular. With 2 cellular providers in each market, 1 nationwide ESMR provider, and 4 or more multi-state PCS providers, market competition provides a superior means to "protect" consumers than a regulatory process which will lead to regulatory costs to CMRS providers and actually will decrease competition.

37. The CPUC ignores this new entry. It states that "...government-created duopoly structure...has created near absolute barriers to entry". (CPUC, Summary, p. II) This statement is completely wrong. Nextel, an ESMR, has already entered and is providing equivalent priced voice grade service in Los Angeles, and its Feb. 11 prospectus states it will reach 90% of the California population by the end of this year.<sup>29</sup> How can there be "absolute barriers to entry" when we see a new entrant in the market which is currently valued at about \$6 billion (including its recent acquisitions)? Future entry of PCS, which also currently offers digital mobile voice service in the UK and will be auctioned beginning this year, also demonstrates an absence of barriers to entry.

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<sup>28</sup> The frequencies are not exactly the same. However, the frequencies are close enough so that no difference in operation is expected.

<sup>29</sup> The CPUC's claim that "cellular service should be viewed as a separate market from other wireless telecommunications, at least for the present and near-term future" (CPUC, p. 24) once again ignores the presence of Nextel. No economic analysis is given for this decision. The claim is extremely curious given the statement by the CPUC in its petition that Airtouch and LACTC attempted to lower their prices in Los Angeles due to the entry of Nextel. (CPUC, p. 43)

B. No Mobile Telecommunications Bottleneck Exists

38. The CPUC then goes on to make another fundamental economic mistake. The CPUC has decided that a bottleneck can occur with "one or two firms". (CPUC, p. 26) The expansion of a bottleneck definition from one to two firms is not based on economic reasoning. Furthermore, the definition is wrong because Nextel has now created these facilities and has proved that the CPUC is wrong to conclude that "because of economic and technological limitations, another firm cannot duplicate the service." (CPUC, p. 26) From an economic point of view, a bottleneck cannot exist when a new entrant can economically enter the market and provide competition. With two cellular carriers the usual definition of a bottleneck is inapplicable; however, the entry of Nextel further demonstrates the mistake in the CPUC's claims. The CPUC concludes that this "bottleneck" is the cause of reseller decreased market share, but it fails to explain how the presence of resellers benefits consumers and, furthermore, why the resellers cannot go out and make a deal to resell Nextel's service.

C. The CPUC's Use of Market Shares Fails to Consider The Economic Effects of New Mobile Telecommunications Competition

39. Instead of doing a forward looking consideration of CMRS competition to cellular, the CPUC depends on market shares of the two current cellular carriers in each MSA. It uses the HHI to calculate that the facilities based carriers are gaining market share and that the resellers are losing market share. (CPUC, pp. 31-34) This finding demonstrates nothing more than large retail chains, e.g. Circuit City and Good Guys, are the most efficient distribution method for cellular CPE and service. While early on in the history of cellular, resellers had a competitive advantage selling service to their car phone (IMTS) and paging customers, once cellular became a mass

market product, mass market outlets could offer better prices.<sup>30</sup> This same outcome has occurred for stereo sound systems, where specialty "hi fi" stores have largely been replaced by the same mass market distribution channels.<sup>31</sup> Note that in MSAs like Chicago with retail rates 40% less than Los Angeles or San Francisco, resellers have almost no share. The presence of resellers does not indicate anything about competition nor about cellular penetration. Cellular penetration in Chicago is significantly higher than in either Los Angeles or San Francisco, according to data I have gathered from the cellular companies which operate in those MSAs.

40. The other use of the HHI by the CPUC is to calculate HHI's at points in the future. (CPUC, pp. 75-78) It concludes that the market will still be highly concentrated by Merger Guidelines standards at these future times. The CPUC recognized that ESMR and PCS would soon begin operation, but it misunderstood the competitive impact of new entry. It attempted to recalculate HHI's taking into account projections of ESMR and PCS CMRS share in the future. However, it made a fundamental economic mistake in failing to recognize that competition takes place at the margin. It is the competition for new customers that sets prices in a market so that looking at overall market shares when new entry has occurred is incorrect.

41. Looking at overall market shares gives a downward biased estimate of the competitive significance of new entry. An example demonstrates this principle. For airline flights between Washington/Baltimore and Cleveland, customers, until last year, could choose either US Air or Continental. Southwest Airlines then decided to enter the market. Initially, Southwest had

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<sup>30</sup> See e.g. U.S. Department of Commerce: "Largely driven by declining equipment costs, the cellular industry has begun to attract users from the consumer market at a higher rate than business users." (U.S. Industrial Outlook 1994, U.S. GPO, January 1994, p. 29-11)

<sup>31</sup> The "Tech Hi Fi" chain in Boston long ago disappeared, and Circuit City is now a major outlet for stereo equipment.

a much smaller share than the other two airlines, but nevertheless airline fares fell rapidly (by over 1/2) on this route. Southwest's entry had a large effect despite its small share. An HHI based on customers share obviously leads to the incorrect conclusion on competition.

42. The economic factors which determine the competitive effect of a new entrant are whether new customers will find the new entrant's service acceptable (demand elasticity) and whether the new entrant can supply sufficient capacity to compete for a significant proportion of the new customers (supply elasticity). Market evidence from the UK demonstrates that demand acceptance already exists for PCS and both Nextel and PCS providers will have more than enough supply capacity to serve all new customers given their digital networks have 3-6 times the capacity of current cellular networks. Thus, the CPUC use of HHI's is an incorrect approach to determine the likely future competitive effects of Nextel and PCS entrants in California. If one uses a supply based HHI where spectrum capacity is used, the HHI with cellular, ESMR, and PCS is 1195 which is toward the very low end of the moderately concentrated range (1000-1800). Thus, the usefulness of an HHI is limited for CMRS because of the rapidly changing technology and new entry. Nevertheless, an appropriate HHI demonstrates that the new entrants from ESMR and PCS will have more than sufficient capacity to create competition which negates the need for regulation.

43. The CPUC makes some incorrect economic claims to attempt to support its position that new competition from Nextel and PCS will not be important. First, it claims that Nextel will not "produce significant competition in the cellular market in the near future." (CPUC, p. 66) This claim fails to explain why AirTouch and LACTC attempted to lower their prices when Nextel entered and Nextel's statement that it will cover 90% of the California population by the end of the year. Market actions, i.e. competitors lowering prices, are much more significant than conversations with Nextel's counsel

(CPUC, p. 66) in determining the competitive effect of Nextel. On PCS the CPUC claims that "the cost of the FCC license will be a formidable initial obstacle." The CPUC must have failed to observe the recent results of the narrowband PCS auctions and also the extremely high level of interests in PCS exhibited by the actions of cable TV companies, out of region cellular carriers, IXCs, LECs, and many other companies.

44. In particular, the CPUC fails to realize that Pacific Bell is likely to be a formidable competitor in PCS, a situation unique to California. In almost all other areas of the country the Block B cellular carrier is also the local LEC. However, in California due to the separation of AirTouch, Pacific Bell has no cellular licenses. Thus, I expect Pacific Bell to be especially aggressive in bidding for PCS licenses and building PCS networks. Indeed, my previous analysis, submitted in my November 1992 affidavit on PCS, and Mr. Reed's analysis both demonstrate that LECs have important economies of scope to provide PCS which will allow them to construct lower cost PCS networks.<sup>32</sup> In its discussion of economies of scale and scope (CPUC, pp. 73-74) as possible barriers(!) to PCS effectiveness, the CPUC fails to recognize that Pacific Bell has significant economies of scale and scope and will provide immediate and significant PCS competition to the cellular carriers.

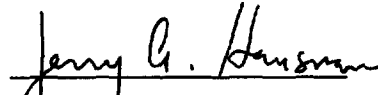
#### V. Conclusion

45. California's regulatory system for cellular has led to higher prices for cellular service and higher prices for CPE than other similar MSAs. California is the only state which requires a mandatory retail margin to protect resellers and forbids bundling of cellular service and CPE. These anti-competitive regulations have led to the expected effect. CPUC regulation is currently costing California cellular customers about \$250 million per year. Yet, the CPUC cannot understand that it has caused the problem.

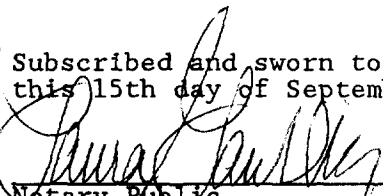
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<sup>32</sup> David P. Reed, "Putting It All Together: The Cost Structure of Personal Communications Services" (OPP Working Paper No. 28, November 1992).

Instead, the CPUC has proposed even more anti-competitive regulations for cellular in California. Only the FCC can protect California cellular customers from the anti-competitive actions of the CPUC. The CPUC's actions place the interests of resellers above the interest of cellular customers. This situation makes no economic sense and can only be corrected by FCC action.

  
Jerry A. Hausman

Subscribed and sworn to before me  
this 15th day of September 1994.

  
Notary Public

My commission Expires 7/3/98

### 1994 Price Regression for Top 30 Cellular Markets

Left hand Side Variable: Log of Price < 1

<u>Variable</u>	<u>Estimate</u>	<u>Standard Error</u>
Intercept	0.539	2.052
Log of Income < 2	0.203	0.236
Log of Population < 3	-0.029	0.052
Log of Commute Time < 4	0.624	0.266
Regulation	0.150	0.052
Number of Observations	58	
Standard Error of Regression	0.148	
R Squared	0.396	

- Notes:
- 1 > Minimum monthly bill is based on 128 minutes of peak calling and 32 minutes of off-peak calling.
  - 2 > Log of per capita personal income. Source: Survey of Current Business, April 1992.
  - 3 > Log of population. Source: 1992 Statistical Abstract.
  - 4 > Mean commute time from home to work. Source: 1990 U.S. Census, Tape File 3c.

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American Editor, Review of Economic Studies, 1979-82  
Associate Editor, Journal of Public Economics, 1982-  
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Member of Governor's Advisory Council (Massachusetts) for Revenue and Taxation, 1984-1992  
Member, Committee on National Statistics, 1985-1990  
Member, National Academy of Social Insurance, 1990-  
Member, Committee to Revise U.S. Trade Statistics 1990-1992  
Director, MIT Telecommunications Economics Research Program, 1988-  
Board of Directors, Theseus Institute, France Telecom University, 1988-  
Member, Conference on Income and Wealth, National Bureau of Economic Research, 1992-

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